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LISTING OF CLAIMS

1 (canceled)

2 (withdrawn). The apparatus of claim 1, wherein said counter and/or reference electrode comprises a material selected to minimize said analyte reaction.

3 (withdrawn). The apparatus of claim 2, wherein said material is a catalyst which is poisoned towards the analyte reaction.

4 (withdrawn). The apparatus of claim 2, wherein the potential of the counter electrode is maintained at a value which renders it inactive to the analyte reaction.

5 (withdrawn). The apparatus of claim 1, wherein said means comprises a barrier which prevents or minimizes access of said analyte to said counter and/or reference electrode.

6 (withdrawn). The apparatus of claim 5, wherein said barrier comprises a scavenger material or electrode at which the analyte reacts before it can reach the counter and/or reference electrode.

7 (withdrawn). The apparatus of claim 5, wherein said barrier comprises a lengthy path through the electrolyte between the working and counter and/or reference electrodes.

8 (withdrawn). The apparatus of claim 2, wherein said material comprises a gaseous or liquid reagent which results in the predominance of a complementary reaction at the counter electrode to the exclusion of the analyte reaction.

9 (withdrawn). The apparatus of claim 2, wherein said analyte is CO or H₂ and said material comprises Ir or oxides of Ir, Au, Pb/PbO₂, Ag/AgCl, Ru, Pd, low-surface-area Pt or any other substance at which electro-oxidation of CO and/or H₂ or other interfering gas is hindered.

10 (withdrawn). The apparatus of claim 9, wherein said analyte is H₂ and wherein the means for preventing the occurrence of interfering gas such as CO at the counter and/or reference electrode is a barrier over the entrance to the gas sensor comprising a thin film of material that is highly permeable to H₂ but impermeable to CO and other interferences.

11 (withdrawn). The apparatus of claim 10, wherein said material is FEP Teflon about 0.002" thick.

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12 (withdrawn). The apparatus of claim 5, wherein said barrier comprises a coating of Nafion or other material over the counter electrode.

14 (withdrawn). The apparatus of claim 8, wherein said analyte is oxidizable and said material comprises oxygen that is fed to the counter electrode through a separate hole.

15 (withdrawn). The apparatus of claim 8, wherein the counter and/or reference electrode is isolated from any sampled gaseous medium.

16 (canceled)

17 (canceled)

18 (currently amended): Amperometric sensing apparatus for detecting an analyte in a gaseous medium, which comprises:

a working electrode at which said analyte is caused to participate in an analyte half-cell reaction;

a reference electrode for controlling the electrochemical potential of said working electrode;

a counter electrode at which a complementary half-cell reaction is caused to occur, wherein all three electrodes are electrochemically connected through an electrolyte and said counter and reference electrodes may be combined into a single electrode;

means of enhancing the reactivity of the counter electrode to the product of the analyte reaction; and

~~The apparatus of claim 17 comprising~~ means for reconverting the product of the analyte reaction back to the analyte and then reacting it again at the working electrode, with such back-and-forth reactions repeating many times, so as to yield an amplification of the analyte signal.

19 (previously presented): The apparatus of claim 18, wherein said reconversions are caused to occur at the counter electrode.

20 (previously presented): The apparatus of claim 19, wherein said sensing apparatus is designed or tuned for reconversion and detection of the NO-NO₂ or Cl-Cl₂ redox couple.

21 (previously presented): The apparatus of claim 19, wherein said working and counter electrodes are interdigitated or comprise an array of electrodes which are addressable in subsets.

22 (currently amended): Amperometric sensing apparatus for detecting an analyte in a gaseous medium, which comprises:

a first working electrode at which said analyte is caused to participate in an analyte half-cell reaction; and

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a second working electrode for reconverting the product of the analyte reaction back to the analyte; and then

means for reacting it said product again at the first working electrode, with such back-and-forth reactions repeating many times, so as to yield an amplification of the analyte signal;

each of said working electrodes being electrochemically connected to its respective pair of counter and reference electrodes;

wherein each of said pairs of counter and reference electrodes may be combined into a single electrode.

23 (previously presented): The apparatus of claim 22, wherein the first of said working electrodes is designed or tuned for detection of NO or Cl species, with the second working electrode optimized for detection or identification of the corresponding oxidizing species, NO₂ or Cl₂.

24 (previously presented): The apparatus of claim 22, wherein said working electrodes are interdigitated.

25 (previously presented): A method of detecting the presence of an analyte or trace thereof in a gaseous medium comprising the steps of:

passing a sample of said gaseous medium over a pair of interdigitated electrodes forming part of an amperometric gas sensor system, while applying an oxidizing potential to one electrode of said pair and a reducing potential to the other electrode of said pair, so as to cause repeated oxidations and reductions of said analyte and of its redox product and thereby produce amplified current signals due to said analyte and product;

measuring said amplified current signals; and

deducing the presence or identity and/or concentration of said analyte in said gaseous medium from said measured current signals.

26 (previously presented): The method of claim 25, wherein said analyte and product comprise the NO-NO₂ or Cl-Cl₂ redox couple.

27 (previously presented): Sensing apparatus for detecting an analyte in a gaseous medium, which comprises:

means for passing a sample of said gaseous medium over a pair of interdigitated electrodes forming part of an amperometric gas sensor system, while applying an oxidizing potential to one electrode of said pair and a reducing potential to the other electrode of said pair, so as to cause repeated oxidations and reductions of said analyte and of its redox product and thereby produce amplified current signals due to said analyte and product; and

means for measuring said amplified current signals.

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28 (previously presented): The apparatus of claim 27, wherein said gaseous medium may be separated from said electrodes solely by a thin layer of electrolyte.

29 (previously presented): The apparatus of claim 27, comprising more than one of said pairs or an array of electrode pairs that are addressable individually or in subsets, each of which can perform oxidation-reduction reactions for a different analyte.


30 (new): The apparatus of claim 27, comprising counter and reference electrodes that are inaccessible to or inactive towards said analyte.

31 (new): The apparatus of claim 27, comprising means for deducing from said amplified signals the identity or concentration of said analyte.

32 (new): The apparatus of claim 22, wherein both of said respective pairs of counter and reference electrodes are substantially identical or similar.

33 (new): The apparatus of claim 22, wherein said counter and reference electrodes are inaccessible to or inactive towards said analyte.

Respectfully submitted by,



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